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JPRS: 4378

6 February 1961

HUNGARIAN SYMPOSIUM OF RADIATION DAMAGE AND PROTECTION

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19990517 149

FOREWORD

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JPRS: 4378

CSO: 1346 S

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[Following is the translation of an article by Dr. Adorjan Ujhelyi entitled "Sugarartalom, sugarvedelem symposion" 1959. november 5-7-ig Budapesten' (English version above), in Magyar Radiologia (Hungarian Radiology), Vol. XII, No 2, Budapest, June 1960, pages 124-126.]

(Held in Budapest, 5-7 November 1959)

The rapid spread of radiological examination methods (X-ray, isotopes) in medical therapy, research and industry has not been accompanied by adequate recognition of the dangers of radiation. There is more than one reason for this. There is on the one hand the inequal development of science, with research in ionization damage lagging behind, and on the other hand the even more serious deficiencies in training and extension education. Without qualification, the state of affairs is even worse with regard to specialized training in this particular area for persons engaged in radiological work. The lack of knowledge of the nature of radiation damage results in contradictory attitudes: one consists in underrating the danger of ionizing radiation and the other is called "radiophobia" and expresses itself in the over-estimation of the danger involved in processes with even minimal radiation. This symposium served to point up the dangers of radio-polypragmasia -- unnecessary use of radiological examinations -- as well as the irradiation loading caused by incompetently conducted examinations by unqualified personnel. Particular emphasis was given to prophylaxis, beginning as far back as the recommendation of a radiological examination; here possible radiation damage must be carefully weighed against the advantages that might be gained by the results. Yet another objective of the symposium was to acquaint medical specialists with the details of the issue of radiation damage. In this country, uniform (free) medical care is being extended to 80 percent of the population. Within a foreseeable period of time, practically the entire population will participate in our social-insurance system. This means that the various medical services, such as radiological examinations, will become available to everybody, thus increasing the radiation loading of the population as a whole. A further purpose of the symposium was to discuss procedures designed to reduce radiation loading of the population. Issues of radiation

protection were not limited to X-ray diagnosis, but encompassed all aspects of the reduction of radiation loading. Consequently, the lecturers included, along with radiologists, physicians using X-ray, radium and isotopes; physicists; and engineers as well. Also, problems of industrial radiation damage were discussed. It was difficult to delimit the topic of the symposium, because of the multiplicity of problems. We strove for completeness, without sacrificing perspicuity, by dealing with such details only which seemed indispensable.

The first morning was taken up by reports on general problems. Prof. Nanior Ratkoczy (X-ray Clinic, Budapest School of Medicine) lectured on the general aspects of radiation damage; the history of radiation damage was surveyed by Pal Deak (Medical Extension Training Institute). Vilmos Varteresz (Central Institute of Radiation Biology) dealt with problems of genetics in terms of radiation biology. Pertinent information was offered on chemical radiation protection by Zoltan Zsebok (Surgical Clinic No 1, Budapest School of Medicine), on skin lesions caused by ultra-hard radiation by F. Giezelt (Berlin), and on the theoretical and practical problems of radiation measurement by Gyula Koczkas (National Institute of Roentgenology and Radiation Physics). Prof. F. Wachsmann (Erlangen) discussed the theoretical and practical aspects of film-dosimetry, based on his wealth of experience.

The following lectures were heard in connection with main topic number one:

"Irradiation Loading of Medicinal Origin in the Population," by Gyorgy Csakany (National Institute of Roentgenology and Radiation Physics), followed by a report on the irradiation loading of the population of Budapest compiled by a study group of the Institute, which found that the gonad loading of the 0 to 30-year age bracket will reach 1.8 rem in 30 years. Istvan Nikl (Hungarian State Railroad Hospital) reported on his gonad measurements on inhomogeneous phantoms, concluding that it is possible to reduce the gonad dose by as much as 98 percent by applying the hard-ray technique with adequate covering. J. Hrabovszky's (Outpatient Clinic of Budapest, Csengery St.) lecture was entitled "Are there Changes in Genetic Prognosis to Be expected as a Result of Medicinal Gonad Loading?" O. Costachel, I. Krepsz, M. Danciel, and N. Voiculescu (Bucarest Institute of Oncology and Marosvasarhely School of Medicine) conducted research into the irradiation loading of patients and physicians resulting from chest and gastric X-ray examinations. They found that the physicians' gonad loading will reach 5 mrem after 14 four-minute chest X-rays and seven 10-minute stomach passage studies. In the Rumanian People's Republic the allowed daily irradiation loading is 5 rem for persons working with ionizing radiation. Antal Szakkay (Budapest TB Institute) and Mihaly Barabas (Koranyi TB Institute) studied the issue of indispensable examinations to detect and treat TB from the viewpoint of the phthisiologist. On the average, a patient will absorb a mini-

mum of 50 rem loading during a six-month hospital treatment, provided the examinations are conducted correctly and with adequate shielding. Miklos Thoroczky (Dermatological Clinic of the Budapest School of Medicine) emphasized, with regard to radiological treatment of skin diseases, that proper hard rays and sufficient shielding are the best methods of depth localization of the lesion, ensuring minimal somatic and gonad loading. Zoltan Nagy and Gyorgy Volny (National Institute of Traumatology) stressed the high degree of radiation hazard to physician and patient alike in traumatology. Pal Sztrilich (Central Institute of Stomatology) pointed out in his lecture, "Problems of Radiation Protection in Dentistry," that exposition time may be abridged by using the most adequate grade of sensitivity for films and correct dark-room techniques; also, that radiation screens and protective panels should be used to protect health of workers. Another important device for radiation protection is focusing in such a manner that the primary ray avoids the gonads and care is exercised to reduce dosage volume. H. Zollner (VEB. C. Zeiss, Jena) discussed radiation loading with serial pictures and moving pictures taken with X-ray. Zsuzsa Leichner delved into the anomalies of X-ray examination practices in the social-insurance network which cause difficulties not only in the X-ray departments but also increasing considerably the irradiation loading of the population. Bela Gimes (X-ray Clinic of the Budapest School of Medicine) discussed the laxities observable in recommending gastric-intestinal studies and offered suggestions as to correct recommendation and examination practices. Imre Eleod and Gabor Hajdu (Army Health Service) examined the advantages and drawbacks of X-ray therapy in chronic tonsillitis, from the viewpoint of the roentgenologist and laryngologist. Laszlo Nyiro (Gynecological Clinic No 2, Budapest School of Medicine) drew attention to the danger to the foetus when submitting gravid women to X-ray examination. He acquainted the audience with the techniques they use to protect the mother and foetus from radiation damage. Odon Schulhof (National Institute of Rheumatology and Balneology) in his "Considerations Regarding the Diagnostics and Therapy of the Organs of Motion, From the Point of View of Irradiation Loading," opined that the advantages of roentgenological examinations and treatment, if proper care is exercised in recommendation and execution, may be exploited to the good of mankind; there is no need to be afraid of the damage caused by them. Geza Gyorgyi (Orthopedic clinic of the Budapest School of Medicine) reported on the techniques developed in the clinic aimed at the protection of the patients in addition to obtaining pictures as perfect as possible. Karoly Geffert and Karoly Dosay (Pediatric Clinic No 1, Budapest School of Medicine, National Institute of Roentgenology and Radiation Physics) expounded problems of irradiation loading (based primarily on their own experiences) in infant and child X-ray examinations. Ivan Rode (National Institute of Oncology) drew attention to the fact that radiation of 8 MeV energy causes residual radioactivity. It is a fact worthy of investigation

that out of the 45 health and clerical workers who entered employment with the Lorant Eotvos Institute of Roentgenology and Radiation (the predecessor of the National Institute of Oncology) 30 years ago, ten are so far diseased with carcinoma. Erno Sarmai (Specialized Outpatient Clinic of Szanto-Kovacs Janos St., Budapest) reported on irradiation loading in patients physicians and other health workers resulting from depth therapy; his remarks were based on personal experience and related literature. Istvan Torok and Istvan Wachtl (Surgical Clinic No 1, Budapest School of Medicine) reported on irradiation loading from Schoenander-Elema serial cameras and from a reel-exchanger apparatus combined with picture intensifier; the data were obtained from their own measurements. Skin dose on the chest was 3.9 rem, gonad dose with lead shielding 3.0 mrem in the course of 29 pictures taken with the Schoenander-apparatus on 35x35-cm plates. After a six-minute moving X-ray bronchiography with intensifier, 312 mrem was measured on the dorsal surface of the patient while the gonad dose with shielding was 40 mrem.

Main topic number two dealt with radiation protection of persons working with ionizing radiation. Janos Barany (Veszprem County Hospital) in a report entitled "Problems of Radiation Protection of Persons Employed in X-ray Departments" expounded the general aspects of the problem. Sandor Eder (National Institute of Labor Hygienics) analyzed the radiation protection requirements of the inspection of heavy industrial structures, both for X-ray and sealed isotope procedures. Janos Regos and Balazs Bugyi (Ganz-Mavag Outpatient Clinic) reported on their experiences regarding dosimetry in industrial X-ray laboratories, O. Costachel, N. Voicules and M. Danciel (Bucarest Institute of Oncology) reported on irradiation loading in persons working with X-ray in radiological clinics, based on their own measurements. J. Szlanina (Medical Extension Training Institute of Prague) in a lecture entitled "Instruction in Radiation Protection in Czechoslovakia," contends that it is necessary to communicate and introduce into medical practice all scientific knowledge regarding radiation protection as soon as it is discovered. The best method to this end is regular, continuous extension training. Laszlo Bozoky (National Institute of Oncology) examined in detail the problems of protection against radiation of greater than 400 kV energy. Karoly Varga (Csepel Iron and Metal Works) reported on experiences obtained in their isotope laboratory. He explained that the irradiation loading of the workers can be kept at an average weekly level of 81.8 mrem, with proper organization. Karoly Dosay (National Institute of Roentgenology and Radiation Physics) reported on the results of radiation measurements conducted in the X-ray laboratories of health institutes and urges the introduction of continuous film-dosimetry. Laszlo Pal (TB Clinic of Budapest) spoke about his experiences with workers assigned to screen-picture apparatuses.

Tibor Predmerszky (National Institute of Labor Hygienics) held the introductory lecture to main topic number three, dealing with radi-



ation damage and radiation protection in the use of radioactive isotopes. Predmerszky discussed the problems arising in connection with unsealed isotopes, such as problems of organization, and technical procedures. He feels it is important -- also for radiation protection purposes -- to employ physicists in therapy and isotope departments. Laszlo Kertesz (Debrecen Nuclear Research Institute) examined, in general terms, the problems of dosing and distribution in the practical application of radioactive isotopes. He showed that the deficiencies and difficulties of calculation render safe dosing almost impossible. I. Krepsz, N. Voicules, O. Popovici, and E. Olianos (Bucarest Institute of Oncology and Marosvasarhely School of Medicine) examined the radiation conditions prevailing in patients having radioactive cobalt placed in their body cavities. Ferenc Vandor (Hospital of Uzsoki St., Budapest) discussed the difficulties of radiation protection in radium and radiocobalt therapy. He emphasized the great importance of regular and continuous radiation measurement. N. Voicules (Bucarest Institute of Oncology) reported on results of his animal experiments with ion-exchanging resins to prevent incorporation of radioactive materials. Laszlo Sztanyik (Central Institute of Radiation Biology) reported on the protective properties of certain synthetic compounds prepared in this country; the report was based on his experiments.

The principal topic of technical radiation protection was introduced by Marton Jordan's (National Institute of Roentgenology and Radiation Physics) lecture. Chief Engineer Jordan reported on the devices and possibilities presently available in the service of protecting both patients and health workers from unnecessary radiation hazards. Pal Vittay (National Institute of Roentgenology and Radiation Physics) announced the completion of an integral dosimeter, designed and built by himself, which indicates the loading dose independently from the quality of radiation and from the width of the bolt slot. Otto Roka (National Institute of Labor Hygienics) pointed out that if the various measuring instruments do not possess calibration curves, they function with an error of +30-40 percent, depending on the radiation quality. Istvan Martos (Medicor) informed the participants of technical problems of radiation protection with modern instruments and the trends of development. Gyula Keresztes, Jozsef Kozman, and Ivan Krepsz (Marosvasarhely School of Medicine) discussed the proper design and equipping of laboratories for the purpose of reducing irradiation loading. Geza Zoltan (National Institute of Roentgenology and Radiation Physics) proposed modification in the current Hungarian standards of radiation protection (MNOSZ 824-51).

The debate following the lectures served to clarify the issued. This brief summary does not intend critically to evaluate the symposium. It is enough to state that the symposium successfully fulfilled its objective of serving the cause of socialist health. It is also obvious that the rapid changes in the development of radiology justifies its occupying a position in medical training commensurate

surate with its great significance.

Note: The lecture material of the Bucarest Institute of Oncology was made available only in manuscript form.